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A new halotolerant species of *Alternaria* from Qinghai-Tibet Plateau, China

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Abstract — A new halotolerant species of *Alternaria, A. xiaochaidanensis,* is described and illustrated. The specimen was collected from a salt lake on Qinghai-Tibet Plateau. The type specimen is deposited in the Herbarium of the Department of Plant Pathology, Shandong Agricultural University (HSAUP).

Key words — taxonomy, saline, extremophiles

Introduction

Salt tolerant fungi have evolved special physiological mechanisms and metabolic products to survive in the extreme environment of salt-water lakes. In recent decades, more attention has been paid to salt tolerant fungi – both halotolerant and halophilic fungi. Cronin & Post (1977) described the first halophilic filamentous fungus, *Cladosporium* sp., from a hypersaline lake in the Great Salt Lake, USA. To date, more than 80 halotolerant fungal species and six halophilic fungi have been reported (Gunde-Cimerman et al. 2005, 2009).

Qinghai-Tibet Plateau region has the world's highest altitude salt lake. It is a potentially huge treasure trove of genetic resources with its diversity of water chemistry characteristics and different biotic and abiotic anti–positive gene. Thus, it is important to study microorganisms of Qinghai-Tibet Plateau, especially halophilic and halotolerant microorganisms. Here, we describe a new species of *Alternaria* that was isolated from Xiaochaidan, a salt lake on Qinghai-Tibet Plateau. This is the first report of a halotolerant *Alternaria* species.

Alternaria xiaochaidanensis F. Wang, A.N. Li, D.M. Dai, X.X. Xu & D.C. Li **sp. nov.**
MycoBank MB 800882 Fig. 1

Differs from *Alternaria chlamydospora* and *A. mouchaccae* by its larger usually beaked conidia and its different conidial shape.

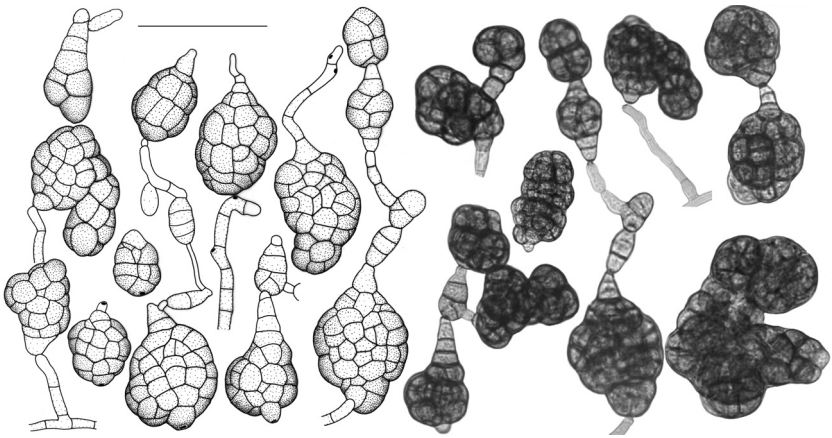

Fig. 1. *Alternaria xiaochaidanensis* (ex holotype).
Conidia, conidiophores and conidiogenous cells. Left: drawings. Right: photomicrographs. (Bar = 50 μm).

Type: China, Qinghai, Xiaochaidan, from a lake soil, altitude 2800–2840 m, July 2011, F. Wang (**Holotype**, HSAUP II 011501; GenBank, JX235958).

Etymology: in reference to the type locality.

Alternaria xiaochaidanensis grows rapidly, colonies on potato carrot agar at 28°C reach 6.5–7.5 cm diam. in 7 days, effuse, circular, pale brown; reverse fuscous-black. Mycelium superficial or immersed; hyphae hyaline, grey–white. Conidiophores either solitary, not branched, 28–54 (–68) × 3–5 μm, or arising as lateral branches from superficial hyphae and up to 170 μm long. Conidia produced from conidiophores or directly from hyphae, solitary or in short chains of 2-5, rostrate or non–rostrate, 13–74 × 6–61μm. Juvenile conidia ovoid or obclavate, pale brown; mature conidia symmetrical or asymmetrical, irregular in shape and size, brown, smooth, walls thickened, with transverse , longitudinal and oblique septa, often constricted at septa.

Comments –This species may be confused with *A. mouchaccae* (Simmons 1981) and *A. chlamydospora* (Mouchacca 1973). However, conidia of those species are smaller: *A. mouchaccae* (25–40(–50) × 12–20(–22) μm) and *A. chlamydospora* (26–70 × 8–48 μm). Although sometimes found in chains of 2–5, conidia in *A. xiaochaidanensis* are usually single; in *A. chlamydospora* conidia are often in chains of 5–8 while conidia of *A. mouchaccae* are rarely in chains. In contrast to *A. xiaochaidanensis,* conidia of *A. mouchaccae* and *A. chlamydospora* have no beak. A conspicuous characteristic of the new species is that mature conidia are symmetrical or asymmetrical and have specific shapes that obviously differ from those of *A. chlamydospora.* Conidiophores of

A. xiaochaidanensis are longer than those of *A. chlamydospora* (15–18 × 3 μm, up to 150 μm) and shorter than those of *A. mouchaccae* (40–50 × 3–4 μm).

A BLAST search comparison of its sequence in GenBank places *A. xiaochaidanensis* into *Alternaria* but with no previously described species close to it.

Gunde-Cimerman et al. (2005, 2009) characterized fungi that can grow in vitro at 3 M salt concentration and are regularly isolated from global environments at salinities above 1.7 M as halophilic, whereas isolates that can grow in vitro sporadically at 3 M NaCl are considered halotolerant. Species isolated above 1.7 M NaCl grow regularly on PDA but slowly at 3 M. According to this definition, the authors consider *Alternaria xiaochaidanensis* a halotolerant fungus.

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